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# Will Immigration Reform Affect the Economic Competitiveness of Labor-Intensive Crops?

James A. Duffield  
Lewell Gunter

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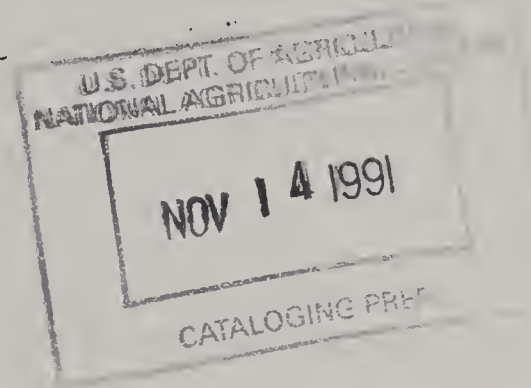
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**Will Immigration Reform Affect the Economic Competitiveness of Labor-Intensive Crops?** James A. Duffield and Lewell Gunter. Agriculture and Rural Economy Division, Economic Research Service, U.S. Department of Agriculture. Staff Report No. AGES 9126.

### **Abstract**

This report identifies U.S. producers of labor-intensive crops most likely to be exposed to more competition if immigration reform increases their labor costs. Import market share data indicate that U.S. producers dominated the 1980-88 consumer market for most of the fruits and vegetables examined. However, five commodities--frozen broccoli, frozen cauliflower, fresh asparagus, fresh tomatoes, and fresh grapes--experience stiff competition from non-U.S. producers. Producers of these commodities are probably most vulnerable if competition intensifies, since foreign producers are already making inroads into these markets.

**Keywords:** Immigration reform, farm labor, economic competitiveness, U.S. trade



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May 1991

## Contents

Introduction.....	1
U.S. Immigration Policies.....	2
Special Agricultural Worker Program (SAW).....	3
Replenishment Agricultural Worker Program (RAW).....	4
Commodity Screening.....	5
Labor's Share of Production Costs.....	6
Import and Export Values.....	8
Trade Quantities and Import Market Shares.....	11
Summary and Implications.....	13
References.....	15
Appendix A: Vegetable Tables.....	16
Appendix B: Fruit and Almond Tables.....	21



# Will Immigration Reform Affect the Economic Competitiveness of Labor-Intensive Crops?

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## Introduction

Farms in the United States have become fewer and larger since the 1940s. The decline in farms has reduced the number of farm operators and unpaid family workers. But, as average farm size grew, U.S. agriculture became more dependent on hired workers. In 1945, hired labor was less than one-fourth of total farm employment (Oliveira). Over one-third of the current farm workforce are employees who receive wages or salaries, or work under a contractual arrangement with the farm operator (Martin). The other two-thirds are farm operators and unpaid workers who furnish roughly the same percentage of the total hours worked on farms.

The hired and contract component of the farm workforce has been the subject of much controversy over the years. The controversy centers on the supply of seasonal workers which includes a large portion of non-U.S. citizens who are subject to U.S. immigration policies. Each year, farmers need a large number of seasonal workers and argue that seasonal labor supply is unpredictable and often scarce when needed the most. As a hedge against this uncertainty, many farmers encourage a tolerant entry program at U.S. borders. They claim that such policies are necessary to help provide an affordable workforce at critical times.

Concerns over labor availability have intensified with the passage of the Immigration Reform and Control Act of 1986 (IRCA). If IRCA is successful at controlling illegal immigration, employers fear that it will reduce labor supply and put upward pressure on wage rates. Higher wage rates could significantly increase the cash operating expenses for growers of labor-intensive crops, such as fresh fruits and vegetables. Furthermore, increases in production costs could affect the sales of U.S. producers who have to compete with foreign prices. This report identifies producers who could be affected by IRCA because the crops they grow are vulnerable to competition from non-U.S. producers with lower labor costs.

## U.S. Immigration Policies

U.S. farm employers have historically depended on foreign workers to supplement the supply of domestic wage and salary workers. Many of the workers were in the United States illegally, and they came because of the disparity in wages and opportunities for employment in their native countries and in the United States. Workers came from Central and South America, the Caribbean, Africa, Asia, and Europe, but Mexico has been the largest single source of labor for the United States (Coltrane).

In 1917, the U.S. Government took its first step to regulate the flow of farmworkers into the United States in response to the labor shortage in World War I. Workers were legally permitted to work farm jobs on a temporary basis. Once the work was completed, the workers were expected to return to their home countries. Temporary foreign agriculture worker programs operated sporadically between World Wars I and II, but have been used on a regular basis since the early 1940s. However, the number of workers admitted annually for farmwork has varied widely. The most workers, 459,850, were admitted in 1956 under the Bracero Program. In 1989, 25,998 temporary farm jobs were filled by foreign workers under the H-2A Program. In general, foreign workers have been legally admitted to work on U.S. farms on a temporary basis to offset labor shortages in times of national emergencies or as an attempt to curtail illegal immigration by providing a legal means for farmers to employ foreign workers. However, the H-2A program has not been used much and data suggest that the flow of nondocumented farmworkers to the United States continues (Oliveira).

The Immigration Reform and Control Act of 1986 (IRCA), Public Law 99-603, expanded the policy of admitting foreign farmworkers temporarily to include giving some nondocumented farmworkers permanent residence status with the option to become U.S. citizens. The motivation to pass IRCA was persistent, large-scale illegal immigration. Congress believed that such immigration was detrimental to U.S. citizens finding employment, and furthermore that it could be controlled by cutting off the supply of jobs available to nondocumented foreign workers. This would be accomplished by imposing sanctions, such as fines and jail sentences, against employers who hire workers who do not have legal documents to show they are eligible to work in the United States.

Rather than risk economic and social disruptions, and huge enforcement costs, by deporting all nondocumented workers, IRCA permitted those who had resided in the United States continuously since before January 1, 1982, to apply for legal U.S. resident status. Over 1.7 million persons applied before the May 4, 1988, deadline. Most of the applicants were approved and may eventually become U.S. citizens. Although it was assumed that some who qualified worked in agriculture, Congress felt that many farmworkers would not qualify for legalization because the seasonal nature of farmwork meant that many illegal farmworkers would not be in this country year-round and could not meet the



residency requirement for legalization. Failure to give legal status to a majority of the large number of aliens employed in agriculture could cause labor shortages and serious disruptions in farm production, especially in labor intensive fruits and vegetables, according to some employers (Coltrane).

### **Special Agricultural Worker Program (SAW)**

The SAW Program was included in IRCA to give nondocumented farmworkers a better chance of becoming legal U.S. residents than they would have under the general amnesty program, and to maintain a supply/demand balance of farm labor for labor-intensive crops. Nondocumented workers were eligible for U.S. resident status and the right to work if they previously did fieldwork in the United States in the production of certain crops. These crops and the type of qualifying work are referred to in IRCA as "Seasonal Agricultural Services" (SAS). All major crops other than hay, silage, forage, grain sorghum/milo, crops grown for seed (except lettuce seed), sugarcane, coffee, tea, and flax were included in the program. No livestock or livestock products were included. Nondocumented workers who did fieldwork in SAS crops for at least 90 days during the year ending May 1, 1986, could apply for legal U.S. resident status. About 1.3 million persons applied, and a high approval rate is expected, even though a large number of applications are suspected to be fraudulent. Approved applicants gain legal residence status and may eventually become U.S. citizens.

The rationale for the SAW Program was that since nondocumented workers comprised a large, but unspecified, segment of hired farmworkers, and the employer sanction provisions of IRCA made the employment of undocumented workers illegal, the legalization of such workers was necessary to prevent labor supply disruptions in U.S. agriculture. Thus, provisions of the SAW Program are based on the implicit assumption that, by making these workers legally entitled to work in agriculture, supply and demand of agricultural labor would remain in balance.

Two factors suggest that if a balance were maintained in the labor market with the SAW Program, this balance might not last for an extended period of time. First, IRCA does not require SAWs to work in agriculture after they become legal U.S. residents. Second, if workers leave agriculture, the employer sanctions would prevent employers from hiring nondocumented workers and replacement workers would have to come from the U.S. resident population to keep supply and demand in balance.<sup>1</sup> Significant increases in farm wages and/or improvements in

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<sup>1</sup> This discussion is predicated on the effectiveness of employer sanctions and Immigration and Naturalization Service's enforcement in keeping illegal aliens from working in U.S. agriculture. If the flow of illegal aliens into agriculture continues at or near pre-IRCA levels, then those market forces that determined the supply of farmworkers before IRCA would continue to be dominant.

working conditions would be required to attract U.S. residents away from higher wage nonfarm employment. This is unlikely to happen anytime soon because seasonal jobs in agriculture do not provide job security and labor productivity is not expected to increase, particularly for the more labor-intensive farm commodities (Brown).

### **Replenishment Agricultural Worker Program (RAW)**

Although there is no requirement that SAW workers continue to work in SAS crops after they become legal U.S. residents, the SAW program is based on a premise that many would do so, at least for some time. However, if the demand for workers in SAS crops exceeds supply in any fiscal year from 1990 to 1993, IRCA has provisions for additional foreign workers to be admitted to the United States to replenish the supply. But the maximum number of Replenishment Agricultural Workers (RAW) admitted each year is the smaller of the estimate of the "shortage" of fieldworkers in SAS crops (the amount the annual supply forecast falls short of the "need" (demand) forecast) and the "annual numerical limitation," which is based on the number of SAW workers who worked in the SAS crops for 15 days or more during the previous year. Section 210A of IRCA directs USDA and the Department of Labor (DOL) jointly to determine the shortage of hired fieldworkers at the national level in all SAS crops combined, and determine the number of RAWs to be admitted to the United States to offset the shortage.

No national shortage was determined by USDA and DOL in the first 2 years of the RAW Program. These results suggest that the present labor supply is more than adequate. However, the full impact of IRCA will not be felt immediately. If IRCA influences the supply of labor, it will take some years before the effects of the initial shock are fully realized (Duffield). It will take time before new citizens working in agriculture adjust to their legal status and begin to leave agriculture for better job opportunities in the nonfarm sector. Thus, labor shortages are more likely to become a problem after the RAW program ends in fiscal year 1993. After that, the H-2A Temporary Foreign Worker Program will be the only legal source of foreign farmworkers. This program, administered by the U.S. Department of Labor, allows U.S. farm employers temporarily to employ foreign workers when qualified U.S. workers are not available at the time and place needed. H-2A workers must return to their home countries once the work specified in their contracts is completed.

The equilibrium position of supply and demand in the farm labor market will eventually be affected if IRCA is successful in controlling illegal immigration. The available supply of farm labor could fall at prevailing wages. A higher wage rate would attract more workers into agriculture, but this would increase total production costs and net revenues could decline for some producers, especially for those growing labor-intensive crops. The effect of a wage increase on net revenue depends on many factors, including labor's share of production costs and the demand elasticity for a particular commodity. With stronger



competition from abroad, some U.S. producers may find it increasingly difficult to increase commodity prices to offset higher labor costs. Commodities susceptible to competition are those that are labor intensive in production and are grown by foreign producers with lower labor costs.

### Commodity Screening

In order to narrow the list of agricultural commodities to those likely to be most affected by a wage increase resulting from IRCA, we screened commodities for specified production and demand characteristics. Labor's share of production expenses was the first screening criterion. A high labor factor share indicates a high increase in production costs for a given increase in wages, if the current input mix is maintained. Furthermore, it is assumed that high labor factor shares for individual commodities imply lower than average elasticities of substitution between labor and nonlabor inputs and lower rates of labor-saving technological change. Producers with these production characteristics are likely to be more vulnerable to competition. Expenditure data from the 1987 Census of Agriculture were used to determine labor's share of production costs (U.S. Department of Commerce).

The second screening is related to consumer demand and the activity of imports and exports of agricultural commodities. Imports may intensify competition if they enter the United States during a period when the product is also marketed by U.S. producers. Likewise, U.S. exports compete with producers who grow the same crops in the export countries. Thus, the flow of trade between countries can provide an indication of which commodities are competing. In addition, steady changes in imports or exports for a particular commodity could be an indication that consumers are responding to relative prices in a competitive market. Both the volume and value of imports and exports are used in the analysis to identify active trade commodities.

The third screening criterion, import market share, provides a measurement of the degree of competition among countries. In an ideal situation, if data on U.S. and foreign production, consumption, trade, and stocks were available, market shares could be calculated for each country participating in the market. However, since data were available only for the United States, a narrower conception of market share was used here. From these data, import market shares were calculated as:

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$$\text{Import Market Share} = \text{Imports} / (\text{U.S. Production} + \text{Imports} - \text{Exports})$$

---

It is assumed that U.S. consumption is approximately equal to U.S. production+imports-exports. High import market shares for

U.S. commodities suggest a high degree of competition from foreign producers.

Data on U.S. imports and exports came from various USDA sources including the Economic Research Service's Situation and Outlook Reports and the Foreign Agricultural Trade of the United States (FATUS, U.S. Department of Agriculture). The number of individual commodities listed by FATUS is too extensive to be completely covered by this report. The 17 chosen commodities had relatively high U.S. export or import values. However, imports like coffee and bananas were excluded since their production in the United States is limited and foreign producers have historically dominated these markets.

### **Labor's Share of Production Costs**

The 1987 Census of Agriculture data indicate that producers of fruits, vegetables, and horticultural specialty crops face the most immediate risks from an increase in farm labor wage rates. Table 1 reports labor and total production expenses by type of farm, according to Census of Agriculture classifications. These data show that labor's share of production expenses is 44 percent for horticultural specialty farms. Labor's share is 40 percent of production costs for fruit and tree nut farms, and almost 37 percent for vegetable and melon farms. Labor expenditures in 1987 were \$1.2 billion for vegetables and melons, \$1.75 billion for horticultural specialties, and \$2.1 billion for fruit and tree nuts. Overall, these farm categories accounted for almost 40 percent of all labor expenditures even though these farms represent only 7 percent of all farms in the United States. Other field crops, which include cotton and tobacco, had labor expenditures that totaled almost \$2 billion, but labor represented less than 20 percent of all production costs. The labor share of production expenses of other farm types, such as cash grains, livestock, and dairy farms, was 6, 5, and 10 percent, respectively. Studies using other sources support these results. Data from USDA's 1986 Farm Costs and Returns Survey, for example, indicate that average labor expenditures per farm are highest on farms classified as vegetable, fruit and tree nut, or nursery and greenhouse farms (Duffield and others). Average labor expenses per farm were highest on vegetable farms at about \$84,985, while fruit and tree nut and nursery and greenhouse farms had average labor expenditures of \$36,128 and \$46,825, respectively. Furthermore, this study presents data which show that vegetable, fruit and tree nut, and horticultural specialty farms were the most labor-intensive, with labor expenses as a share of total cash operating expenses ranging between 30 and 40 percent. This is consistent with data from the 1987 Census of Agriculture.

In summary, the data indicate that horticultural crops, fruits and tree nuts, and vegetables and melons have the highest labor expense shares among major U.S. agricultural commodities. Since little production and demand data are available for horticultural crops, this commodity group was eliminated as a candidate for further analysis, and commodities in the other labor-intensive



Table 1--Labor expenditures, by type of farm, 1987

Item	Unit	Vegetable and melon	Horticultural specialty	Fruit and tree nut	Cash grains	Other crops	Livestock and dairy	Other farms
Farms	Number	28,801	31,469	88,323	458,396	301,516	1,030,578	148,676
Farms with hired labor	Number	13,669	17,130	44,072	177,383	129,587	387,540	48,966
Percentage with hired labor	Percent	47.5	54.4	49.9	38.7	42.9	37.6	32.9
Farms with contract labor	Number	6,945	7,601	34,064	41,978	44,326	116,343	20,837
Percentage with contract labor	Percent	24.1	24.15	38.56	9.2	14.7	11.3	14.0
Production expenses	\$1,000	3,382,425	3,979,229	5,312,061	19,691,207	8,906,453	51,248,405	13,407,708
Hired labor expenses	\$1,000	929,159	1,614,813	1,512,511	1,084,179	1,638,286	3,112,357	974,931
Contract labor expenses	\$1,000	305,924	140,156	589,352	109,813	280,667	282,503	134,571
Labor as percentage of production expenses	Percent	36.5	44.1	40.0	6.1	21.5	6.6	8.3
Average labor expense per farm	Dollars	42,883	55,768	23,797	2,605	6,463	3,294	7,038

Source: 1987 Census of Agriculture.

classifications were subjected to further screening based on changes in U.S. trade balances.

## **Import and Export Values**

FATUS data in tables 2 and 3 show annual values of imports and exports for the selected vegetables and fruits from 1985 to 1988. Table 3 also includes values for almonds. Average values of imports and exports were calculated for 1980/81 and 1987/88 and the percentage change in these values shows the total change in exports and imports since 1980. Averages were taken to moderate the effect of sharp variations in production due to temporal conditions such as bad weather and crop diseases.

### Vegetables

Mexico is the single largest source of imported vegetables. Fresh tomatoes, peppers, and cucumbers enter the U.S. market from Mexico during the winter months when domestic production is limited to Florida and California (Buckley). Tomatoes have the highest value among the vegetable imports (table 2). Tomato import value peaked in 1986 and then sharply fell in 1987 and 1988. Tomato imports were higher in years in which Florida experienced substantial crop damage from winter freezes. Since 1980/81, fresh broccoli imports have had the highest percentage increase, amounting to over 3,000 percent. However, in absolute terms, fresh broccoli imports remain relatively small; the import value of fresh broccoli was only about \$4 million in 1988. Most broccoli is imported to the U.S. frozen. The import value of frozen broccoli in 1988 was almost \$50 million. Asparagus, frozen cauliflower, and onions have experienced increases in imports of around 250 percent. Peppers, cucumbers, and carrots showed only moderate increases in import value.

Canada, Japan, and the European Community are the major markets for U.S. exports of vegetables and fruits. Asparagus showed the largest percentage increase in export value among the fresh vegetables reported. The average 1987/88 export value for asparagus was 133 percent greater than the average value in 1980/81. Cauliflower and broccoli also increased in export value with 48- and 26-percent changes in the 1987/88 average values, respectively. The export value for carrots remained fairly stable over the study period. The celery export value moved up and down over the years, and the 1987/88 value was 8 percent less than the 1980/81 value. In terms of absolute value, the 1987/88 average export value for lettuce was the highest among the fresh vegetables reported. Tomatoes had the second highest 1987/88 export value, but did not experience a steady increase similar to lettuce. Frozen vegetables export values increased every year throughout the study period.

### Fruits and Almonds

Imports of fruit products listed in table 3 have generally increased. Fresh grapes, primarily from Chile, showed the largest increase in 1987/88 import value and also had the largest

Table 2--Vegetables: Export and import value

Commodity	Average, 1980/81	1985	1986	1987	1988	Average, 1987/88	Percent change 1980/81-1987/88
Imports:							
Vegetables--1							
			-----1,000 dollars-----				Percent
Asparagus	5,299	11,035	15,563	19,483	19,340	19,411	266
Fresh broccoli	106	703	924	2,884	4,426	3,655	3348
Frozen broccoli	8,123	25,666	35,596	49,701	48,852	48,276	494
Frozen cauliflower	3,803	11,518	11,955	15,039	14,057	14,548	283
Tomato	184,836	173,075	334,946	167,030	157,808	162,419	-12
Peppers	54,976	99,049	80,037	66,040	72,037	69,039	26
Onions	20,793	39,991	42,336	63,298	81,209	72,254	234
Cucumbers	48,569	82,784	64,707	63,563	45,645	54,604	12
Carrots	9,984	13,717	14,277	9,878	13,407	11,643	16
Exports:							
Fresh vegetables--							
Asparagus	11,970	13,361	13,181	20,922	34,896	27,909	133
Broccoli	10,974	13,449	12,353	12,481	15,126	13,804	26
Cauliflower	6,677	8,180	8,481	9,324	11,051	10,188	48
Carrots	11,556	10,328	11,119	10,793	13,317	12,055	4
Celery	18,851	15,673	15,957	15,937	18,892	17,415	-8
Lettuce	45,264	35,747	37,467	47,870	51,070	49,470	9
Tomatoes	46,702	38,256	37,266	42,103	46,916	44,510	-5
Frozen vegetables	84,289	92,315	123,559	143,335	181,432	162,383	93

1 The commodity is a combination of frozen and fresh vegetables unless indicated.

2 Statistics on imports into the United States include commodities transhipped through the United States to Canada.

Source: Foreign Agricultural Trade of the United States, Calendar Year Supplements, 1981, 1985, 1987, and 1988, USDA, ERS.

Table 3--Fruits and almonds: Export and import value

Commodity	Average, 1980/81	1985	1986	1987	1988	Average, 1987/88	Percent change 1980/81-1987/88
Imports:	-----1,000 dollars-----						<u>Percent</u>
Fruits and orange juice-- <sup>1</sup>							
Fresh apples	35,411	62,641	70,442	62,233	53,128	57,681	63
Fresh grapes	46,204	169,332	163,388	211,173	254,385	232,779	404
Fresh oranges	6,831	14,907	16,306	17,253	9,663	13,458	97
Frozen strawberries	26,209	16,373	17,774	26,065	17,182	21,624	-17
Fresh cantaloup	20,029	30,408	37,372	42,278	41,404	41,841	110
Orange juice <sup>2</sup>	122,428	11,428	412,771	454,754	548,363	501,395	309
Almonds (shelled)	125	227	782	1,226	729	978	682
Exports:							
Fresh fruits--							
Oranges and tangerines	197,244	241,666	233,725	223,853	201,081	212,467	8
Lemons and limes	93,767	93,716	96,820	95,613	102,392	99,003	6
Apples	148,943	93,021	102,045	96,333	138,241	117,287	-21
Grapes	88,673	76,444	102,602	108,008	129,457	118,733	34
Grapefruit	104,497	92,431	136,058	169,239	222,186	195,713	88
Fruit juices--							
Orange	135,874	97,730	67,681	86,821	121,497	104,159	23
Grapefruit (conc., froz.)	20,582	18,471	15,730	24,200	35,310	29,755	45
Almonds (shelled)	284,586	309,917	299,271	334,289	437,703	385,996	36

<sup>1</sup> The commodity is a mix of frozen and fresh fruits unless indicated.<sup>2</sup> Does not include nonconcentrated.

Source: Foreign Agricultural Trade of the United States, Calendar Year Supplements 1981, 1985, 1987, and 1988, USDA, ERS



absolute import value every year with the exception of orange juice. The import value of frozen strawberries (mostly from Mexico) fluctuated over the years. They were the only fruit to have a lower 1987/88 import value compared with 1980/81. Cantaloup import values increased over 100 percent. Import values for fresh apples and fresh oranges increased 63 and 97 percent, respectively. Orange juice experienced substantial increases in import value since 1980. The majority of orange juice comes from Brazil.

Most of the growth of fresh fruit exports is directly attributable to fresh grapefruit. Exports of fresh grapefruit increased 88 percent over the past decade. Grapefruit juice exports also experienced large increases over the years. The change in the 1987/88 export value for grapefruit juice was 45 percent. Orange and tangerine and lemon and lime exports increased but not as much as grapes, which increased by 34 percent. Fresh apple exports decreased by over 20 percent in value. Although there has been a steady increase in the export value of orange juice since 1986, the 1987/88 value of orange juice exports was 23 percent less than its 1980/81 average value.

Almonds are a major export commodity for the United States. Their export value increased 36 percent over the study period. Almond imports also increased significantly (682 percent), but the total import value of almonds remains relatively low.

### **Trade Quantities and Import Market Shares**

Appendix tables 1 through 10 give production, consumption, import quantities, export quantities, and import market shares for the selected vegetables which are reported by Economic Research Service, USDA. Appendix tables 11 through 16 show production, consumption, and trade data for the selected fresh fruits which are reported annually by ERS, USDA. Almonds are reported in appendix table 17.

#### Vegetables

U.S. consumption and production for most of the vegetables reported have either increased or have stayed about the same with the exception of the production of frozen broccoli and frozen cauliflower. U.S. production of these commodities experienced a slight decrease over the study period. The 1987/88 average production level of frozen broccoli was 6 percent less than the 1980/81 production level. The 1987/88 average production level of frozen cauliflower was 11 percent less than the 1980/81 average level. Fresh asparagus, fresh broccoli, fresh carrots, and fresh cauliflower had relatively high increases in production. Fresh tomatoes, fresh onions, and fresh lettuce had moderate production increases. Fresh celery experienced less than a half percent decrease in production.

Exports of fresh asparagus, broccoli, and cauliflower increased, but export levels for carrots, celery, tomatoes, onions, and lettuce went down. Export quantities for frozen broccoli and

frozen cauliflower were not available. Imports for all the vegetables reported increased. Fresh broccoli had the most noticeable increase in imports. Fresh broccoli imports increased from 700,000 pounds in 1980 to 36 million pounds in 1988. Fresh asparagus, fresh celery, fresh onions, fresh lettuce, frozen broccoli, and frozen cauliflower also experienced large increases in imports. Only fresh carrots, fresh cauliflower, and fresh tomatoes had import increases of less than 100 percent.

Import market share data provide a measurement of the relative strength of foreign competition for the selected commodities. The import market shares for most of the fresh vegetables were small, according to the formula defined earlier. Among the fresh vegetables reported, tomatoes and asparagus had the largest import market shares, averaging about 20 and 16 percent, respectively. Market share estimates for most of the fresh vegetables did not appear to be trending upward, with the exception of asparagus (app. table 1). The import market share of asparagus increased every year during the study period, with a 22-percent increase in 1988. Export data were not available for frozen broccoli and cauliflower; however, the data did show that imports for these commodities increased considerably. Since U.S. production of these commodities declined over the study period, the domestic market share of foreign producers probably increased significantly. Appendix tables 9 and 10 show import market shares for frozen broccoli and frozen cauliflower assuming zero exports. With this assumption, the import market share of frozen broccoli increased from 9 percent to 46 percent. For frozen cauliflower, the share increased from 9 percent to 34 percent.

### Fruits and Almonds

U.S. production for most of the selected fruits increased only slightly during the 1980s. Peaches were the only fruit reported to show a decline in U.S. production. U.S. consumption of peaches also went down slightly. Consumption for all the other fruits reported experienced small to moderate increases.

Exports of apples fell every year from 1980 to 1985; however, in 1987, exports of apples rebounded to their second highest level over the 9-year study period. Fresh grapefruit exports increased throughout the study period. The 1987/88 average level of grapefruit exports was 73 percent greater than the 1980/81 average level. Exports for the other fresh fruits reported remained about the same.

Imports of the noncitrus fruits trended upward during the 1980s, especially imports for peaches, grapes, and pears. The 1987/88 average import value for peaches, grapes, and pears increased 1,000, 309, and 283 percent, respectively. Orange and grapefruit import values fluctuated over the years with no apparent trend.

The import market shares for the fresh fruits are small, with the exception of grapes. In 1980, 14 percent of total U.S. grape consumption was supplied by foreign producers. By 1987, foreign producers had captured about one-third of the U.S. fresh grape



market. Peaches are the only other fresh fruit in which imports were larger than exports in 1988. However, the import share of fresh peaches remains relatively low.

U.S. production and consumption of almonds increased over the years. The volume of exports was much greater than almond imports. Imports amounted to only about 483,000 pounds in 1988, compared with over 3.5 million pounds for exports. However, imports increased at a much faster rate than exports. The 1987/88 import level was over 900 percent larger than the 1980/81 level. Exports increased 79 percent over the same time period.

### **Summary and Implications**

This report identifies U.S. producers of labor-intensive crops that are most likely be exposed to more competition if IRCA increases labor costs. Agricultural commodities were screened based on labor intensity in production and trade activity in the international market. The labor cost share screening indicated that vegetables and melons, fruits and tree nuts, and horticultural crops would most likely be affected by higher wages, since labor's share of total production expenses for these commodities ranges between 36 and 44 percent.

The data required for the trade activity screening were not available for horticultural crops. Therefore the analysis continued by focusing on data that were available for fruits, tree nuts, and vegetables. Seventeen commodities were selected that had relatively high import or export values over the study period. Import values in the 1980s increased for most of the commodities selected. Almonds, fresh broccoli, frozen broccoli, fresh grapes, and orange juice showed the largest increases in import value. Exports also showed a general rise in value, but not as much as imports.

The final screening criterion looked at changes in import and export volume and import market share for almonds and the selected individual fruits and vegetables. With the exception of carrots, imports increased for all the selected commodities in the study. The volume of imports was greater than exports for 6 of the 17 commodities examined in 1988. However, the volume of most of these imports was still minor compared with total U.S. production and consumption. Import market shares indicated that the U.S. consumer market for most of the commodities examined was dominated by U.S. producers. An exception to U.S. dominance was apparent in the trade data for frozen broccoli and frozen cauliflower. The 1988 import market share for frozen broccoli and frozen cauliflower was 46 percent and 34 percent, respectively. Imports of fresh asparagus, fresh tomatoes, and fresh grapes also showed signs of penetrating the U.S. market, with import market shares of 22, 19, and 33 percent, respectively.

Policymakers are concerned with potential labor shortages if IRCA is successful in controlling illegal immigration. A reduction in

the farm labor force could cause wages to rise and significantly increase the cash operating expenses for growers of labor-intensive crops. Producers claim that rising production costs could make it increasingly difficult for them to compete with nondomestic prices. The trade data screening found only low levels of competition from outside the United States for most of the commodities in the study. These results suggest that producers of most fruit and vegetables are not affected by nondomestic prices and outside competition probably has little effect on their marketing practices and resource allocation decisions.

The trade screening did, however, identify five commodities with high import market share values: frozen broccoli, frozen cauliflower, fresh asparagus, fresh tomatoes, and fresh grapes. It appears that foreign producers of these commodities have already made important inroads into the U.S. market, and these commodities are probably most vulnerable if competition intensifies. Farm managers who produce these crops can respond in a number of different ways if IRCA affects production costs. Numerous marketing options and resource allocation adjustments could be involved in this decisionmaking process, such as adopting management practices that increase labor productivity or switching to less labor-intensive crops.

Conclusions of this report are conditioned on current trade agreements between the United States and its agricultural trading partners. Import tariffs and other trade barriers on fruits and vegetables provide a high degree of protection in most countries, including the United States. Current trade balances could change among trading countries if agricultural trade policies are modified. For example, the North American Free Trade Agreement (NAFTA) could alter the flow of fruits and vegetables between the United States and Mexico. A reduction in tariffs could increase imports of fruits and vegetables from Mexico because producers there generally have cheaper labor costs. On the other hand, U.S. growers who have production and marketing advantages over their Mexican counterparts will increase their exports to Mexico. If a United States-Mexico free trade area is created, it will likely obscure IRCA in terms of its potential impact on U.S. producer competitiveness.



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## Appendix A: Vegetable Tables

Appendix table 1--Fresh asparagus

Year	U.S. production	Imports	Exports	U.S. consumption	Import's market share
-----1,000 cwt-----					Percent
1980	784	72	164	692	10
1981	819	88	162	745	12
1982	N.A.	161	150	N.A.	N.A.
1983	N.A.	202	135	N.A.	N.A.
1984	1,043	143	214	972	15
1985	1,152	180	186	1,146	16
1986	1,387	240	112	1,515	16
1987	1,388	284	206	1,466	19
1988	1,481	326	294	1,513	22
Average 1980/81	802	80	163	719	
Average 1987/88	1,435	305	250	1,490	
Percent change	79	281	53	107	

N.A. = data not available.

Appendix table 2--Fresh broccoli

Year	U.S. production	Imports	Exports	U.S. consumption	Import's market share
-----1,000 cwt-----					Percent
1980	3,795	7	406	3,396	**
1981	4,517	9	545	3,981	**
1982	5,414	1	573	4,842	**
1983	5,582	4	560	5,026	**
1984	6,740	36	680	6,096	1
1985	7,154	45	551	6,647	1
1986	8,442	85	484	8,044	1
1987	8,611	227	474	8,364	3
1988	10,023	360	565	9,818	4
Average 1980/81	4,156	8	476	3,659	
Average 1987/88	9,317	294	520	9,091	
Percent change	124	3575	9	148	

\*\* Less than .5 percent.

Source: USDA, ERS, 1989.

Appendix table 3--Fresh carrots

Year	U.S. production	Imports	Exports	U.S. consumption	Import's market share
	-----1,000 cwt-----				<u>Percent</u>
1980	13,704	1,087	625	14,166	8
1981	14,511	879	874	14,516	6
1982	15,685	1,051	784	15,952	7
1983	15,234	1,025	693	15,567	7
1984	15,476	2,129	806	16,798	12
1985	15,347	1,478	602	16,223	9
1986	23,594	1,134	590	24,139	5
1987	30,606	998	556	31,048	3
1988	25,485	971	683	25,773	4
Average 1980/81	14,107	983	749	13,841	
Average 1987/88	28,046	984	620	28,410	
Percent change	99	.10	-17	105	

Appendix table 4--Fresh cauliflower

Year	U.S. production	Imports	Exports	U.S. consumption	Import's market share
	-----1,000 cwt-----				<u>Percent</u>
1980	2,801	73	184	2,690	3
1981	3,489	112	295	3,306	3
1982	3,420	108	276	3,252	3
1983	3,704	125	332	3,498	4
1984	4,817	135	355	4,598	3
1985	4,904	163	286	4,781	3
1986	5,906	131	316	5,721	2
1987	5,928	143	347	5,724	3
1988	6,515	146	412	6,246	2
Average 1980/81	3,145	92	240	2,998	
Average 1987/88	6,222	145	380	5,986	
Percent change	98	59	58	100	

Source: USDA, ERS, 1989.

Appendix table 5--Fresh celery

Year	U.S. production	Imports	Exports	U.S. consumption	Import's market share
-----1,000 cwt-----					<u>Percent</u>
1980	18,655	48	1,363	17,340	**
1981	18,628	74	1,417	17,285	**
1982	19,139	102	1,537	17,704	**
1983	18,287	139	1,455	16,971	**
1984	18,757	47	1,523	17,281	**
1985	18,349	128	1,182	17,294	1
1986	17,614	148	1,140	16,622	1
1987	17,847	273	1,130	16,990	2
1988	19,423	325	1,277	18,471	2
Average 1980/81	18,642	61	1,390	17,313	
Average 1987/88	18,635	299	1,204	17,731	
Percent change	**	390	-13	2	

\*\* = Less than .5 percent.

Appendix table 6--Fresh tomatoes

Year	U.S. production	Imports	Exports	U.S. consumption	Import's market share
-----1,000 cwt-----					<u>Percent</u>
1980	25,393	6,490	2,630	29,253	22
1981	25,981	5,266	1,923	29,323	18
1982	26,769	4,926	1,755	29,941	16
1983	27,237	5,382	1,755	30,864	17
1984	28,189	8,240	1,593	34,835	23
1985	29,898	8,510	1,478	36,930	23
1986	31,554	9,811	1,283	40,082	24
1987	32,099	9,109	1,452	39,756	23
1988	35,685	8,168	1,613	42,240	19
Average 1980/81	25,687	5,878	2,277	29,288	
Average 1987/88	33,892	8,639	1,533	40,998	
Percent change	32	47	-33	40	

Source: USDA, ERS, 1989.



Appendix table 7--Fresh onions

Year	U.S. production	Imports	Exports	U.S. consumption	Import's market share
-----1,000 cwt-----					<u>Percent</u>
1980	33,526	1,328	2,566	32,289	4
1981	35,155	1,361	4,201	32,315	4
1982	41,861	1,657	1,407	42,111	4
1983	38,762	2,049	1,832	38,980	5
1984	43,657	2,672	2,739	43,590	6
1985	45,059	2,637	1,216	46,480	6
1986	43,301	2,476	1,644	44,133	6
1987	45,867	3,712	1,958	47,620	8
1988	48,264	4,070	2,451	49,885	8
Average 1980/81	34,341	1,345	3,383	32,302	
Average 1987/88	47,066	3,891	2,204	48,752	
Percent change	37	189	-35	51	

Appendix table 8--Fresh lettuce

Year	U.S. production	Imports	Exports	U.S. consumption	Import's market share
-----1,000 cwt-----					<u>Percent</u>
1980	63,297	151	3,021	60,427	**
1981	62,649	114	3,889	58,874	**
1982	62,949	146	3,791	59,304	**
1983	57,969	214	3,722	54,462	**
1984	64,309	326	3,360	61,274	1
1985	61,804	378	2,836	59,346	1
1986	63,715	232	3,116	60,831	**
1987	67,972	183	3,304	64,852	**
1988	71,024	374	3,488	67,910	1
Average 1980/81	62,973	133	3,455	59,651	
Average 1987/88	69,498	278	3,396	66,381	
Percent change	10	110	-2	11	

\*\* = Less than .5 percent.  
Source: USDA, ERS, 1989.

Appendix table 9--Frozen broccoli

Year	U.S. production	Imports	Exports	U.S. consumption	Import's market share
	-----1,000 cwt-----				<u>Percent</u>
1980	2,958	301	N.A.	N.A.	9
1981	3,005	392	N.A.	N.A.	12
1982	3,404	424	N.A.	N.A.	11
1983	2,744	446	N.A.	N.A.	14
1984	3,542	870	N.A.	N.A.	20
1985	3,473	1,026	N.A.	N.A.	23
1986	3,087	1,558	N.A.	N.A.	34
1987	2,821	2,591	N.A.	N.A.	48
1988	2,770	2,369	N.A.	N.A.	46
Average 1980/81	2,982	347			
Average 1987/88	2,796	2,480			
Percent change	-6	614			

Appendix table 10--Frozen cauliflower

Year	U.S. production	Imports	Exports	U.S. consumption	Import's market share
	-----1,000 cwt-----				<u>Percent</u>
1980	1,454	139	N.A.	N.A.	9
1981	1,732	194	N.A.	N.A.	10
1982	1,951	294	N.A.	N.A.	13
1983	1,710	302	N.A.	N.A.	15
1984	1,871	441	N.A.	N.A.	19
1985	1,760	527	N.A.	N.A.	23
1986	1,621	602	N.A.	N.A.	27
1987	1,447	837	N.A.	N.A.	37
1988	1,374	719	N.A.	N.A.	34
Average 1980/81	1,593	167			
Average 1987/88	1,411	778			
Percent change	-11	218			

Source: USDA, National Agricultural Statistics Service (NASS), and U.S. Department of Commerce.

## Appendix B: Fruit and Almond Tables

Appendix table 11--Fresh apples, utilization

Year	U.S. production	Imports	Exports	U.S. consumption	Import's market share
-----Million lbs.-----					<u>Percent</u>
1980	4,934	177	687	4,424	4
1981	4,442	150	596	3,996	4
1982	4,537	198	596	4,139	5
1983	4,621	234	492	4,363	5
1984	4,665	242	463	4,444	5
1985	4,222	315	327	4,210	7
1986	4,464	310	369	4,405	7
1987	5,610	263	655	5,218	5
1988	5,240	256	576	4,920	5
Average 1980/81	4,688	164	508	4,210	
Average 1987/88	5,425	260	439	5,077	
Percent change	16	58	-31	21	

Appendix table 12--Fresh grapes, utilization

Year	U.S. production	Imports	Exports	U.S. Consumption	Import's market share
-----Million lbs.-----					<u>Percent</u>
1980	1,025	124	270	879	14
1981	980	202	248	934	22
1982	1,413	280	241	1,452	19
1983	1,343	321	246	1,418	23
1984	1,354	427	235	1,546	28
1985	1,563	464	231	1,796	26
1986	1,559	441	330	1,670	26
1987	1,432	682	305	1,809	38
1988	1,663	652	326	1,989	33
Average 1980/81	1,003	163	259	907	
Average 1987/88	1,548	667	316	1,899	
Percent change	54	309	22	109	

Source: USDA, ERS, 1990.



Appendix table 13--Fresh oranges, utilization

Year	U.S. production	Imports	Exports	U.S. consumption	Import's market share
	-----Million lbs.-----			Percent	
1980	4,034	18	921	3,131	1
1981	3,710	29	781	2,958	1
1982	4,786	13	1,017	3,782	**
1983	3,802	39	811	3,030	1
1984	3,808	28	898	2,938	1
1985	4,306	62	869	3,499	2
1986	4,234	44	874	3,404	1
1987	4,490	50	738	3,802	1
1988	4,018	17	904	3,131	1
Average 1980/81	3,872	24	851	3,045	
Average 1987/88	4,254	34	821	3,467	
Percent change	10	40	-4	14	

\*\* = Less than .5 percent.

Appendix table 14--Fresh peaches, utilization

Year	U.S. production	Imports	Exports	U.S. consumption	Import's market share
	-----Million lbs.-----			Percent	
1980	1,324	9	40	1,293	1
1981	1,331	7	66	1,272	1
1982	977	13	68	922	1
1983	967	29	40	956	3
1984	1,287	37	40	1,284	3
1985	925	64	32	956	7
1986	1,091	73	43	1,121	7
1987	1,114	81	45	1,150	7
1988	1,223	95	65	1,253	8
Average 1980/81	1,328	8	53	1,283	
Average 1987/88	1,169	88	55	1,202	
Percent change	-12	1000	4	-6	

\*\*Less than .5 percent.  
Source: USDA, ERS, 1990.

Appendix table 15--Fresh pears, utilization

Year	U.S. production	Imports	Exports	U.S. consumption	Import's market share
	-----Million lbs.-----				Percent
1980	690	19	102	607	3
1981	756	22	115	663	3
1982	732	22	79	675	3
1983	766	27	76	717	4
1984	646	40	60	626	6
1985	694	55	65	684	8
1986	752	70	80	742	9
1987	910	73	97	886	8
1988	854	88	134	808	11
Average 1980/81	723	21	110	635	
Average 1987/88	882	81	116	849	
Percent change	22	283	5	34	

Appendix table 16--Fresh grapefruit, utilization

Year	U.S. production	Imports	Exports	U.S. consumption	Import's market share
	-----Million lbs.-----				Percent
1980	2,228	9	651	1,586	1
1981	2,316	4	574	1,746	**
1982	2,594	5	680	1,919	**
1983	2,056	2	548	1,510	**
1984	1,822	5	438	1,389	**
1985	2,176	6	594	1,588	**
1986	2,400	4	766	1,638	**
1987	2,664	11	1,019	1,656	1
1988	2,794	9	1,097	1,706	1
Average 1980/81	2,272	7	613	1,666	
Average 1987/88	2,729	10	1058	1,681	
Percent change	20	30	73	1	

\*\* = Less than .5 percent.

Source: USDA, ERS, 1990.

Appendix table 17--Almonds, utilization, shelled, marketable production

Year	U.S. production	Imports	Exports	U.S. consumption	Import's market share
	-----1,000 lbs.-----				<u>Percent</u>
1980	305,140	70	186,930	118,280	**
1981	383,130	40	207,890	175,280	**
1982	330,760	570	177,980	153,350	**
1983	221,790	180	171,700	50,270	**
1984	563,640	240	266,760	297,120	**
1985	444,000	460	332,190	112,270	**
1986	235,690	692	174,010	62,372	1
1987	634,557	646	343,295	291,908	**
1988	564,500	483	363,973	201,010	**
Average 1980/81	344,135	55	197,410	146,815	
Average 1987/88	599,529	565	353,634	246,459	
Percent change	74	926	79	68	

\*\* = Less than .5 percent.

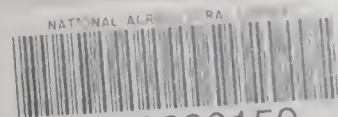
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